

There is a lot of chatting
going on between the
OBU and the
new transceivers.

Single Lane Transceiver
TRX1320-A



Dedicated Short Range Communication (DSRC) Single Lane Transceiver TRX1320-A



The transceivers TRX1320-A and TRX1220-A are roadside devices for communication with On Board Units (OBU) or Transponders (TRP) that follow DSRC standards according to CEN TC278.

Full compliance with CEN DSRC standards and public documents like Global Specification for Short Range Communication (GSS), A1, Cardme 4 and Cesare II secures that interoperability with other EFC systems is achieved.

Product Description

Stand alone version is typically used in single-lane environment and means the application where the transceiver autonomously performs the communication to the OBU/TRP according to the DSRC protocol and processes the transaction data that are subsequently sent to a back-office system. The transceiver TRX 1320-A is connected directly to the customer's back-office system. It is designed to handle the communication autonomously without the need for a separate controller or PC. The transceiver also processes the transaction data that are subsequently sent to the back-office system via standard Ethernet connections with TCP/IP protocol.

Within the limits given by the CEN standards, the characteristics of the transceiver are software configurable by the application software. Important parameters such as frequency channel and radiated power can thus be tailored to the particular installation.

The electrical installation requires just one cable for connection to the TRX1320-A. The cost of maintenance is therefore kept to a minimum, not only because of the high reliability but also by limiting the stock of spare-parts to not more than one type. For special applications the transceiver can be equipped with an antenna which serves a wide communication zone. (TRX1220-A).

Main Characteristics

- Fully “stand alone”: no additional components needed
- Buffer for more than 10.000 transactions. (Extensions available)
- Ethernet and RS232 or RS485/RS422 IF available
- Fully CEN/DSRC standards compliant according to CEN TC278
- GSS - Global Specification for Short Range Communication conformity
- Compliant with CESARE II (specification for interoperable toll systems issues by the Association of European Toll Road Operators (ASECAP))
- Interoperable with CEN/DSRC compliant equipment from different manufacturers
- Sharp communication zone, no cross talk or cross lane reading
- Weather resistant, robust and compact housing complying IP67
- Compact housing ideal for mounting at any place
- Easy to install

Antenna Characteristics

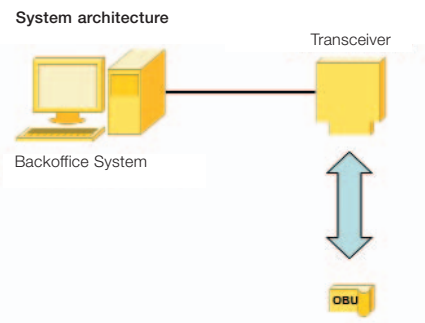
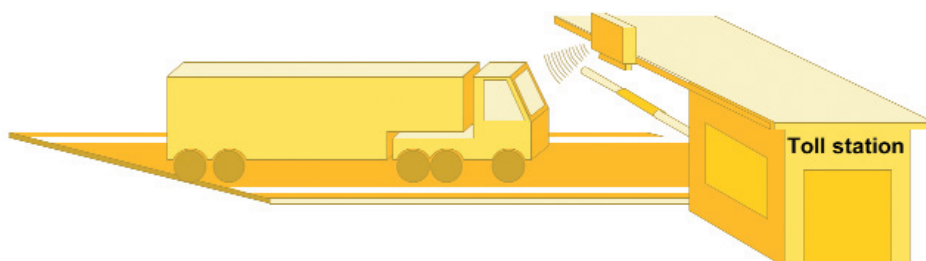
The antenna unit consists of a receiving and a transmitting antenna designed as planar antennas in microstrip technology which are mounted on a circuit board. Electrical beam shaping is realized by combining the individual patches to a “phased array”.

Communication Zone

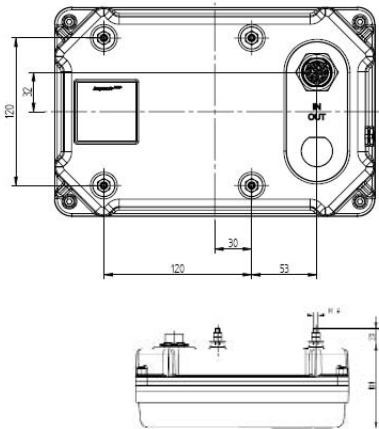
The communication zone is defined as the area in which the BER (Bit Error Rate) of the communication between the transceiver and the OBU/TRP is below 10^{-6} .

The communication zone of the transceiver is nearly elliptical. The size is dependent besides others on the mounting height and the position of the transceiver as well as of the antenna characteristics of the transceiver and the OBU/TRP. At a transceiver mounting height of 5.5 m and a OBU/TRP mounting height of 1.3 m a typical communication zone of the of the TRX1320-A covers 3 m x 3 m (length x width). (TRX1220-A has a communication zone of 3 m x 4 m (length x width)).

Typical Installations



The transceiver is mounted on a gantry above the lane or under the toll station. The standard mounting position covers most of the requirements in multi-lane environments. Extraordinary mounting positions can be met within project specific solutions.



Technical Specification

Mechanical

Dimensions:	260 x 170 x 110 mm	Housing: Aluminium Diecasting
Weight:	3 kg	

Electrical

Frequency Range:	5.795 GHz – 5.815 GHz	Voltage of Power Supply: 24 - 48 VDC
Channel 1:	5.7975 GHz $\pm$ 2.5 MHz	Power Consumption: 11W / 4W standby
Channel 2:	5.8025 GHz $\pm$ 2.5 MHz	Radiated Power: $\leq$ +33dBm EIRP
Channel 3:	5.8075 GHz $\pm$ 2.5 MHz	
Channel 4:	5.8125 GHz $\pm$ 2.5 MHz	Security

Data Rate (down-/uplink): 500 kbit/s / 250 kbit/s, Encryption, DES, 3DES

Environmental Conditions

Operation Temperature:	-33°C - +55°C
Storage Temperature:	-40°C - +70°C
Protection Classification:	IP 67
Vibrations:	3,5 mm / (1 .. 9) Hz 10 m/s ² / (9 .. 150) Hz
Shock:	150 m/s ² / 11 ms
Mounting Position:	2.5 m - 6.5 m above road

Total Memory	TRX1x20-A
Flash Memory	8 MB
SDRAM	16 MB
Non-Volatile RAM	$\leq$ 512 kB
Real Time Clock	X

Antenna Characteristics

Antenna Polarization: left hand circular

Typical Communication zone at a mounting height of 5,5 m, centre of lane

OBU	Truck	Car
TRX1320-A	TRX1220-A	TRX1320-A
Width: 2 m	Width: 3 m	Width: 3 m
Length: 3 m	Length: 3 m	Length: 3 m
(elliptical)	(elliptical)	(elliptical)

Interface

TRX1320-A/1220-A	Serial interface RS422/ RS485 (incl. Termination resistors; TxD and RxD only) & Ethernet/TCP/IP
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Applications

TRX1320-A	Stand alone for AVI, ETC single lane narrow communication zone Connection to Back Office System (customer)
TRX1220-A	Stand alone for AVI, ETC single lane wide communication zone Connection to Back Office System (customer)